Space Weather Forecast

Issued on Friday, 28 April 2023 at 01:28 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

Space Weather Forecast Headline: Decreasing Chance of Minor Storms. Chance of Moderate X-ray flare activity and R1 Minor/R2 Moderate radio blackouts throughout.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity was at Moderate levels over the past 24 hours, with occasional Common class activity and a single Moderate class flare at 27/1113UTC from AR3288 in the south-centre disc. The majority of the Common class flares were also generated by AR3288, which remains magnetically complex and also the largest region on the disc. Most remaining sunspot regions appear small, weak and either stable or decaying slightly, except for AR3289 which shows moderate magnetic complexity.

Despite Coronal Mass Ejections (CMEs) having been seen leaving the northeastern solar horizon over the 24 hours or so, and a filament eruption associated with a Common class flare from AR3289, no Earth directed CME's are expected.

Solar Wind / Geomagnetic Activity: The solar wind showed the continued influence of a fast wind regime from a coronal hole feature.

The solar wind speed was at elevated to strong levels throughout, averaging around 630 km/s at first and then around 580 km/s by the end of the day. The solar wind had a brief peak of 719 km/s at 27/0546 UTC. The strength of the solar wind's magnetic field persisted at weak levels, while the north-south component fluctuated weakly between positive and negative, with no protracted negative periods observed.
The net effect of the above solar wind measures was for disturbed geomagnetic activity, but below Minor Geomagnetic Storm G1 throughout.

Energetic Particles / Solar Radiation: No solar radiation storms were observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is Likely to remain Low, with a Chance of reaching Moderate levels. No significant regions leave and no returning regions are currently expected to rotate onto the visible disc, leading to a flat trend of probabilities.

Solar Wind / Geomagnetic Activity: A filament (arc of plasma) eruption on 24 April produced a CME (Coronal Mass Ejection) which was previously expected to produce a glancing blow at Earth. However, this CME is now overdue and appears to have missed Earth. Further filament eruptions on 25-26 April gave CMEs which are considered most likely to miss, but there remains a very low risk of a glancing blows today and tomorrow (28 and 29 April).

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Therefore the on-going enhanced solar wind from coronal hole influence dominate the forecast, with Elevate to Strong winds expected to persist today and tomorrow, and thereafter a gradual decline to slightly elevated levels by the end of the forecast period. Geomagnetic activity is expected to be Unsettled to Active today and tomorrow, with a chance of isolated Minor geomagnetic storm intervals today, especially at first. Geomagnetic activity is expected to decline to become Quiet to Unsettled during Days 3 and 4 (30th and 1st May).

Energetic Particles / Solar Radiation: Overall no solar radiation storms are expected, but there is a slight chance of a storm occurring over the four days due to the westward advance of the largest and magnetically complex region on the disc.

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	30	20	10	1
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	30	30	30	30
Very Active	R3 to R5 X	No	1	1	1	1

Solar Radiation Storms - (High Energy Protons):

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Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	**≥ S1**	No	5	5	5	5
Very Active	**≥ S3 ***	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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